SOME ECOLOGICAL ASPECTS ON THE COLLEMBOLA PODUROMORPHA DISTRIBUTION IN SPANISH RANGES OF MOUNTAINS

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НЕКОТОРЫЕ ЭКОЛОГИЧЕСКИЕ АСПЕКТЫ РАСПРЕДЕЛЕНИЯ КОЛЛЕМБОЛ PODUROMORPHA В ГОРНЫХ ХРЕБТАХ ИСПАНИИ

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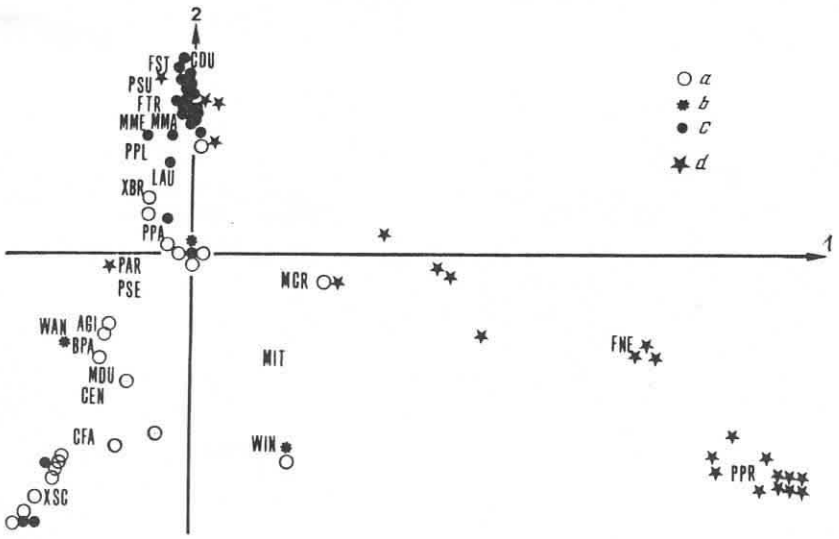
The purpose of this work is to study the distribution of Poduromorpha, Collembola in different mountain ranges of the Iberian Peninsula.

Material and Methods

Samples were taken during November 1971, June and July 1972, in several environments and sites, specially in three mountain systems: Sierra de Gua-



F i g. 1. Analysis of correspondences. Representation of species and samples. Axis 1 and 2. a – Montes de Toledo, b – Montes de León, c – Sierra de Guadarrama, d – Sierra Nevada. For species code see the species dictionary below (Fig.2)

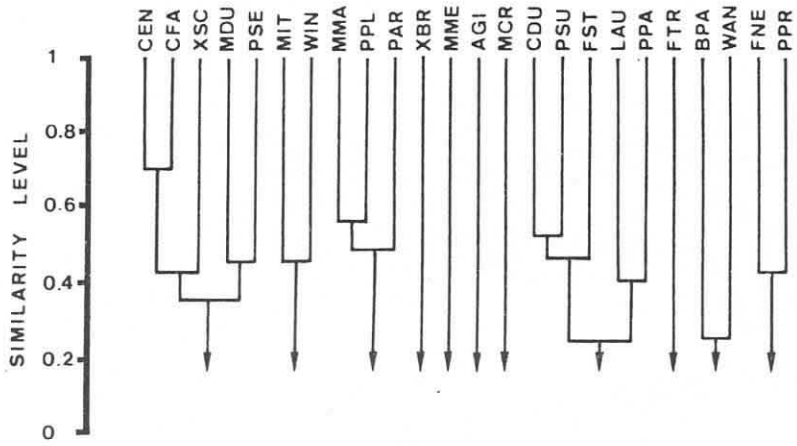
darrama, Segovia (1310-1540 m), Montes de Toledo (760-1150 m) and Sierra Nevada, Granada (1460-3350 m). They include materials from the Montes de León, Porma, León (1200 m).

With the purpose of observe the distribution of the species in different ecological systems, an analysis of correspondences /4/ was carried out upon the table data crossing the 24 more frequent species and 80 samples. In this analysis were introduced as ilustrative variables Xenylla brevisimilis, Willemia anophthalma and Protaphorura armata for the reason that they interfere with the results.

A dendrogram of similarity /3/ was formed upon the affinity matrix that becames from the use of the Driver and Kroeber index /2/.

Results and Discussion

The distribution of samples and species on the plan of the factorial axis 1 and 2 from the analysis of correspondences is shown in Fig.1. The axis 1 was explained as an altitude gradation. By this way, the negative values of the axis 1 show the environments of the Montes de Toledo (760-1150 m) and Sierra de Guadarrama (1310-1540 m). In the positive values take place the habitats of Sierra Nevada (1460-3350 m). Projecting all the samples on the axis 1, Montes de Toledo and Sierra de Guadarrama remain very close, while it stands out on the positive side of Sierra Nevada. This is due because the altitude differences are smaller between the two first systems. Besides, this altitude situation is closely bound to the type of vegetation. While in the Montes de Toledo prevail the forests of Quercus, in Guadarrama, further the



F i g. 2. Dendrogram of similarity among species

Species dictionary: CEN - Ceratophysella engadinensis; CFA - C. falcifer; XSC - Xenylla schillei; MDU - Microgastrura duodecimoculata; PSE - Pseudachorudina sp.; MIT - Mesaphorura italica; WIN - Willemia intermedia; MMA - Mesaphorura macrochaeta; PPL - Pseudachorutes palmiensis; PAR - Protaphorura armata; XBR - Xenylla brevisimilis; MME - Micranurida meridionalis; AGI - Anaphorura gisini; MCR - Mesaphorura critica; CDU - Ceratophysella duodecimoculata; PSU - Protaphorura subparallata; FST - Friesea steineri; LAU - Lathriopyga aurantiaca; PPA - Pseudachorutas parvulus; FTR - Friesea truncata; BPA - Brachystomella parvula; WAN - Willemia anophthalma; FNE - Friesea nevadensis; PPR - Protaphorura prolata

oakwood, appears pinewood and mixed forests. In Sierra Nevada it comes to a situation of meadows and pastures of high mountain.

The axis 2 was interpreted as a seasonal opposition. So, the correspondent samples of Guadarrama, collected in November, places mainly on the positive values of the axis. In the other hand, Montes de Toledo and Sierra Nevada (June and July, respectively) make on the negative values.

This samples and species disposition permits to characterize three types of communities. First, the environments of small altitude (Montes de Toledo) show as a dominant species Xenylla schillei (XSC), living in the oak forests. Ponge (1980) finds it associated, however, to open environments with a humidity and desiccation alternance. Its thermophily also point Bonnet et al./1/. With it, must be added Ceratophysella engadinensis (CEN), and Ceratophysella falcifer (CFA). Although, while X.schillei divides the presence in both litter and soil, both the other species are found in the soil. Second, we find the collembological community of Sierra Nevada, featured by Friesea nevadensis (FNE) and Protaphorura prolata (PPR). Both are evident representative of the meadows and pastures of high mountains. Nevertheless, PPR also lives in the oak forest soils of fall altitude. Between Toledo and Sierra Nevada communities is found, in the analysis, Guadarrama. It is here where Protaphorura subparallata (PSU) acts like distinctive species colonizing in a more as-

siduos way the fermentation level and the soil of pine forests. With it coexist Friesea steineri (FST) and Ceratophysella duodecimoculata (CDU). Notwithstanding, the three species take part of the collembola fauna of the soil in the oak forests of this system.

Mesaphorura macrochaeta (MMA), that appears at the positive side of the axis 2, really it is euritope species. It is found in the three communities. This position is due to a better representation in Sierra de Guadarrama.

Figure 2 shows the dendrogram of similarity among species.

Foreground presents a group of predominant species in Montes de Toledo, that agrees the disposition in the analysis of correspondences. That means C.engadinensis and C.falcifer, dwellers in the soil of oak forests and thickets, and X.schillei, colonist of a bigger number of habitats. Together with them are Microgastrura duodecimoculata (MDU) and Pseudachorudina sp. by their presence in the oakwood soil.

Mesaphorura italica (MIT) and Willemia intermedia (WIN) are present in the three communities, litter and soil dwelling species of oak and pine forests.

The similarity among M.macrochaeta, Pseudachorutes palmiensis (PPL) and P.armata (PAR) are due to their presence in the soils of oak forests and they suppose the transition between Montes de Toledo and Guadarrama, besides X.brevisimilis (XBR), Micranurida meridionalis (MME), Anaphorura gisini (AGI) and Mesaphorura critica (MCR).

F.steineri, Lathriopyga aurantiaca (LAU) and Pseudachorutes parvulus (PPA) join the species limited to Guadarrama, C.duodecimoculata and P.subparallata.

Finally, the group of F.nevadensis and P.prolata has the same characteristics that shown in the analysis of correspondences. Join M.macrochaeta, they are main species of the collembola of Sierra Nevada, in the podzol soils of high mountain plant communities.

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